

Date=04/09/2020

Lecture By=Arkesh Jaiswal

Subject ⇒ Computer Networking

IN PREVIOUS LECTURE (QUICK RECAP) Date-03/02/2020	In Today's Lecture (Overview)
<ul style="list-style-type: none">⇒ Threads - Linux Implementation⇒ Fork and Exec⇒ Context Switching⇒ Copy on Write⇒ The init process⇒ MCQs⇒ Questions for Self practice / CC for the day	<ul style="list-style-type: none">⇒ What is Computer Network⇒ Challenges While designing the computer network⇒ Types Of NetworksOn The Basis OF How they Are connectedOn the Basis Of Area they covered=Osi reference Model⇒ Mcqs

⇒ What is Computer Network

=A computer network is a group of computers that use a set of common communication protocols over digital interconnections for the purpose of sharing resources located on or provided by the network nodes.

The normal definition of Networking can be a process where information is exchanged between two or more people in an organization that can help you in many ways.

=What is the Purpose Of computer networking??

-Purpose of network is Resource And Data Sharing

⇒ Challenges While designing the computer network

1. Reliability

Network channels and components may be unreliable, resulting in loss of bits while data transfer.

2. Scalability

Networks are continuously evolving. The sizes are continually increasing leading to congestion. Also, when new technologies are applied to the added components, it may lead to incompatibility issues.

3. Addressing

At a particular time, innumerable messages are being transferred between large numbers of computers.

4. Error Control

Unreliable channels introduce a number of errors in the data streams that are communicated.

5. Flow Control

If the rate at which data is produced by the sender is higher than the rate at which data is received by the receiver there are chances of overflowing the receiver. So, a proper flow control mechanism needs to be implemented.

6. Routing

There may be multiple paths from the source to the destination.

7. Security

A major factor of data communication is to defend it against threats like eavesdropping and surreptitious alteration of messages

⇒ Types Of Networks

1) On The Basis OF How they Are connected

A.Wireless Network

B.Wired Network

==Wireless Network

- Wifi
- Bluetooth
- Mobile Data
- Nfc

==Wired Network

- Ethernet
- Optic Fibers
- Telephones .. etc

2) On the Basis Of Area they covered

- PAN (Personal Area Network)
- SAN (Storage Area Network)
- EPN (Enterprise Private Network)
- VPN (Virtual Private Network)
- MAN(Metropolitan Area Network)

=Osi reference Model

The Open Systems Interconnection **model** (**OSI model**) is a conceptual **model** that characterises and standardised the communication functions of a telecommunication or computing system without regard to its underlying internal structure and technology.

1. The Physical Layer

This layer includes the physical equipment involved in the data transfer, such as the cables and switches. This is also the layer where the data gets converted into a bit stream, which is a string of 1s and 0s. The physical layer of both devices must also agree on a signal convention so that the 1s can be distinguished from the 0s on both devices.

2. The Data Link Layer

The data link layer is very similar to the network layer, except the data link layer facilitates data transfer between two devices on the SAME network. The data link layer takes packets from the network layer and breaks them into smaller pieces called frames. Like the network layer, the data link layer is also responsible for flow control and error control in intra-network communication (The transport layer only does flow control and error control for inter-network communications).

3. The Network Layer

The network layer is responsible for facilitating data transfer between two different networks. If the two devices communicating are on the same network, then the network layer is unnecessary. The network layer breaks up segments from the transport layer into smaller units, called packets, on the sender's device, and reassembling these packets on the receiving device. The network layer also finds the best physical path for the data to reach its destination; this is known as routing.

4. The Transport Layer

Layer 4 is responsible for end-to-end communication between the two devices. This includes taking data from the session layer and breaking it up into chunks called segments before sending it to layer 3. The transport layer on the receiving device is responsible for reassembling the segments into data the session layer can consume.

5. The Session Layer

This is the layer responsible for opening and closing communication between the two devices. The time between when the communication is opened and closed is known as the session. The session layer ensures that the session stays open long enough to transfer all the data being exchanged, and then promptly closes the session in order to avoid wasting resources.

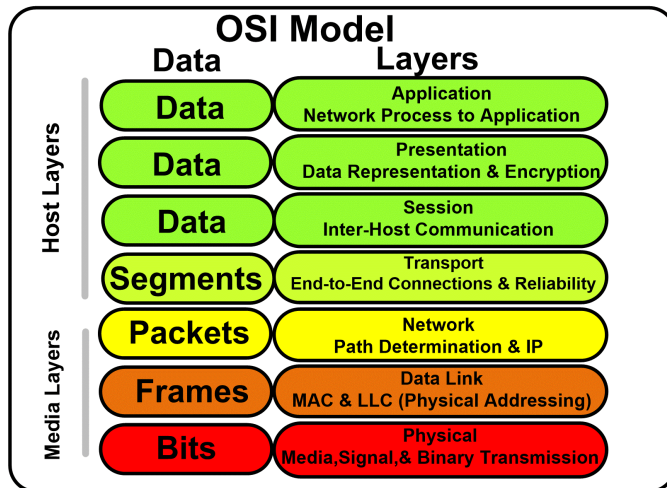
6. The Presentation Layer

This layer is primarily responsible for preparing data so that it can be used by the application layer; in other words, layer 6 makes the data presentable for applications to consume. The presentation layer is responsible for translation, encryption, and compression of data.

Two communicating devices may be using different encoding methods, so layer 6 is responsible for translating incoming data into a syntax that the application layer of the receiving device can understand.

7. The Application Layer

This is the only layer that directly interacts with data from the user. Software applications like web browsers and email clients rely on the application layer to initiate communications. But it should be made clear that client software applications are not part of the application layer; rather the application layer is responsible for the protocols and data manipulation that the software relies on to present meaningful data to the user.



⇒ Mcqs

1. What is the full form of OSI

A = Open Systems Internet

B = Open Systems InterConnection

C = Open Systems InterCommunication

2. Which layer transports electric signals?

A = Physical

B = Data Link

C = Network

D = Transport

3.Which layer takes care of addressing and routing?

A = Physical

B = Data Link

C = Network

D = Transport

4.Which layer has user interaction?

A = Transport

B = Session

C = Presentation

D = Application